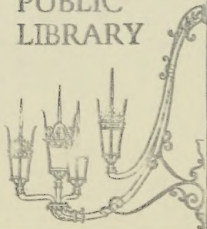


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Urban Renewal Project - Mass. R-35
CODE NO. R-224

Project Improvements Report

PRELIMINARY COST ESTIMATES OF SPECIAL PROJECT IMPROVEMENTS

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BOSTON REDEVELOPMENT AUTHORITY
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Foldout at end

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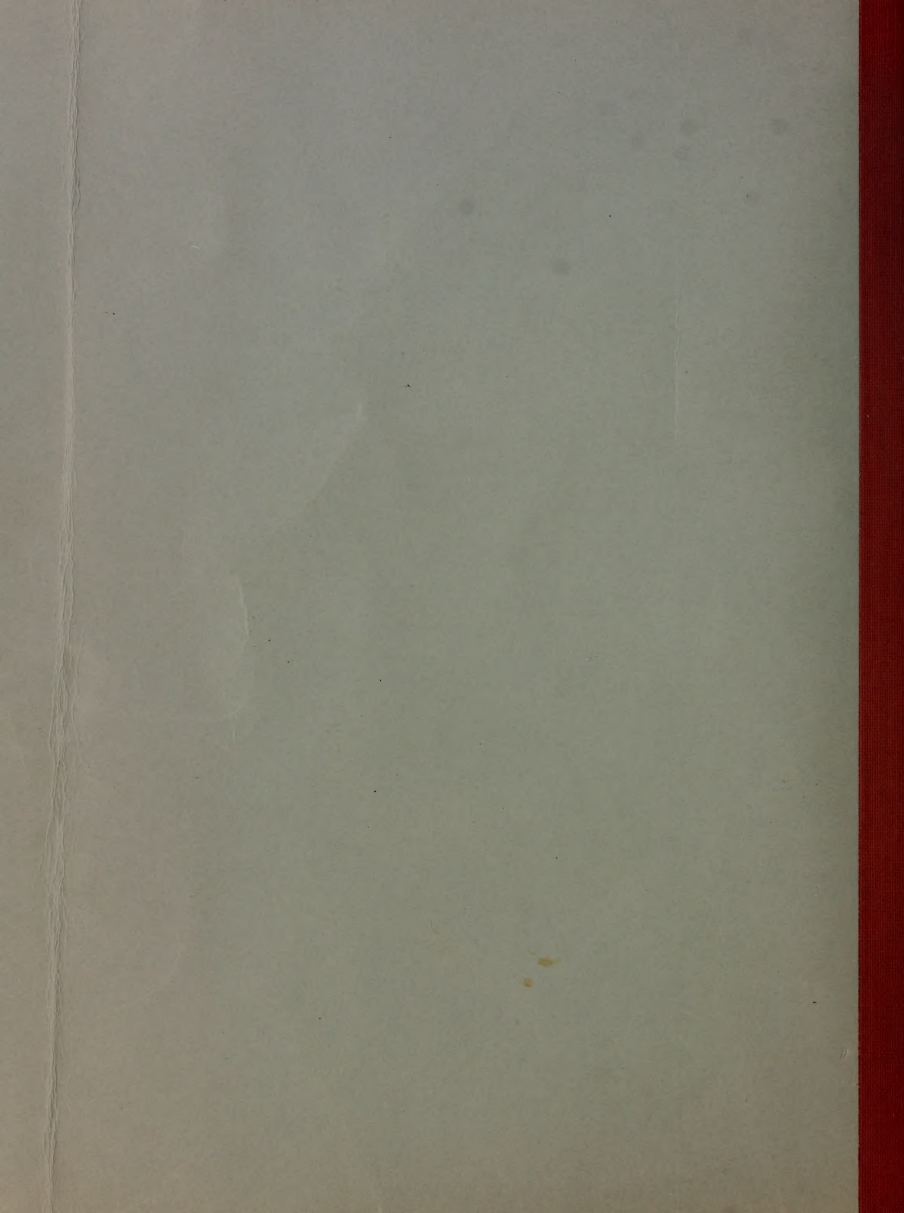
THE CLARKESON ENGINEERING COMPANY, INC.

285 COLUMBUS AVENUE, BOSTON 16, MASSACHUSETTS

COMMONWEALTH 6-7720

Center

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GOVERNMENT CENTER - BOSTON

Urban Renewal Project - Mass. R-35

PRELIMINARY COST ESTIMATES OF
SPECIAL PROJECT IMPROVEMENTS

CODE NO. R-224

Project Improvements Report

The following special project improvements are those which were determined to be absolutely necessary, after achieving the urban renewal objective.

PRELIMINARY COST ESTIMATES OF
SPECIAL PROJECT IMPROVEMENTS

They reflect careful studies of existing facilities, the proposals and objectives of the Plan as well as the topographic and subsoil conditions within the project area.

The unit prices used are those which reflect in the opinion and experience of the consulting engineer, the most recent and

Prepared for: Boston Redevelopment Authority

By: I. M. Pei & Associates
Architects and Planners

Clarkeson Engineering Company, Inc.
Consulting Engineers

June 30, 1961

R-224 (Special)

RAISON PUBLIC REPORT

GOVERNMENT CENTER - BOSTON

Urban Renewal Project - Mass. R-35

Project Improvements Report
CODE NO. R-22#

PRELIMINARY COST ESTIMATES OF
SPECIAL PROJECT IMPROVEMENTS

Prepared for: Boston Redevelopment Authority

By: I. M. Pei & Associates
Architects and Planners

Clarkson Engineering Company, Inc.
Consulting Engineers

June 30, 1961

R-22# (Special)

SUMMARY

CODE NO. R-224

<u>Project Improvements Report</u>	
Underpass (New)	\$2,000.00
Pedestrian Overpass (City Hall)	\$46,000.00
Government Center Comm.	\$51,000.00
<u>PRELIMINARY COST ESTIMATES OF SPECIAL PROJECT IMPROVEMENTS</u>	
Pedestrian Square Grading	\$2,000.00
Subway Conversion to Concourse (Corn Hill)	\$2,000.00

The following descriptions of the various special project improvements are those which were determined to be absolutely necessary, after thorough analysis in order to achieve the urban renewal objectives of the Government Center Project.

They reflect careful studies of existing facilities, the proposals and objectives of the Plan as well as the topographic and subsoil conditions within the project area.

The unit prices used are those which reflect in the opinion and experience of the consulting engineer, the most recent and often used figures by contractors in the locality for the same or similar work.

In summary form, the following table lists cost estimates for those special project improvements which were studied in detail.

R-224 (Special)

CODE NO. R-224

Project Improvements Report

PRELIMINARY COST ESTIMATES OF
SPECIAL PROJECT IMPROVEMENTS

The following descriptions of the various special project improvements are those which were determined to be absolutely necessary, after thorough analysis in order to achieve the urban renewal objectives of the Government Center Project. They reflect careful studies of existing facilities, the proposals and objectives of the Plan as well as the topographic and subsol conditions within the project area. The unit prices used are those which reflect in the opinion and experience of the consulting engineer, the most recent and often used figures by contractors in the locality for the same or similar work. In summary form, the following table lists cost estimates for those special project improvements which were studied in detail.

SUMMARY

Underpass (New Congress Street)	\$ 82,000.00 ✓
Pedestrian Overpass (City Hall)	546,000.00 ✓
Government Center Common	751,000.00 ✓
Dock Square Plaza Area	142,000.00 ✓
Pemberton Square Grading	82,000.00
Subway Conversion to Concourse (Corn Hill)	82,000.00 ✓
Public Parking Garage	6,142,000.00 ✓
Central Artery Interchange Adjustments	2,280,000.00 ✓
Central Artery Adjustments (Interim Costs)	6,000.00

TOTAL

\$ 10,113,000.00

SUPPLEMENTARY

Underpass (New Congress Street)	\$ 82,000.00
Pedestrian Overpass (City Hall)	246,000.00
Government Center Common	721,000.00
Dock Square Plaza Area	142,000.00
Pemberton Square Grading	82,000.00
Subway Conversion to Concourse (Corn Hill)	82,000.00
Public Parking Garage	6,142,000.00
Central Artery Interchange Adjustments	2,280,000.00
Central Artery Adjustments (Interim Costs)	6,000.00
<hr/>	
TOTAL	\$ 10,113,000.00

UNDERPASS (NEW CONGRESS STREET)

Underpass Grading-Excavation 6,200 C.Y. @ \$1.00 = \$6,200.00

Underpass Lighting (See Sketch A)

56 100 W Rapid Start Fluorescent Units
 with Ballast @ \$175.00 \$9,800.00

56 100 W Rapid Start Fluorescent Units
 no Ballast @ \$150.00 \$8,400.00

2600 L.F. #6 - 1/C Cable @ \$165.00/1000' \$ 429.00

50 L.F. 1-1/2" Conduit @ \$1.30 \$ 65.00

150 L.F. 2" Conduit @ \$1.60 \$ 240.00

2 Junction Boxes @ \$150.00 \$ 300.00

1 Manhole @ \$1500.00 (Use 1/2 of cost) \$ 750.00

\$19,984.00

Use

\$20,000.00

Underpass Drainage (See Sketch B)

11 Catch Basins @ \$200.00 \$2,200.00

6 Manholes @ \$200.00 \$1,200.00

400 L.F. 12" Reinforced Conc. Pipe @ \$ 12.00 * \$4,800.00

450 L.F. 15" Reinforced Conc. Pipe @ \$ 12.00 * \$5,400.00

\$13,600.00

Use

\$14,000.00

Retaining Walls (See Sketch C)

Footing Concrete 210 C.Y. @ \$25.00 \$ 5,250.00

Stem Concrete 270 C.Y. @ \$60.00 \$16,200.00

Reinforcing Steel 71,500 Lbs. @ \$0.13 \$ 9,295.00

Excavation 1500 C.Y. @ \$ 2.00 \$ 3,000.00

\$33,745.00

Use

\$34,000.00

GRAND TOTAL

\$ 74,200.00

10% E & C

7,400.00

\$ 81,600.00

Use

\$ 82,000.00

* \$12.00 represents average cost per linear
foot - allowing for ground water and deep
cut.

R-224 (Special)

UNDERPASS (10M CONCRETE SLAB)

Underpass Gravel-Excavation 6,200 C.Y. @ \$1.00 = \$6,200.00

Underpass Retaining (See Sketch A)

25	100 W. Rapid Set Concrete Units with Ballast	@ \$12.00	\$3,000.00
25	100 W. Rapid Set Concrete Units no Ballast	@ \$12.00	\$3,000.00
2500	L.F. 1/2" - 1/2" Cable	@ \$12.00/1000'	\$30,000.00
20	L.F. 1-1/2" Conduit	@ \$1.30	\$26.00
120	L.F. 2" Conduit	@ \$1.60	\$192.00
2	Function Boxes	@ \$150.00	\$300.00
1	Manhole @ \$1500.00 (Use 1/2 of cost)		\$750.00
			<u>\$34,378.00</u>

Use \$34,378.00

Underpass Drainage (See Sketch B)

11	Catch Basins	@ \$200.00	\$2,200.00
6	Manholes	@ \$200.00	\$1,200.00
100	L.F. 12" Reinforced Conc. Pipe	@ \$12.00*	\$1,200.00
120	L.F. 12" Reinforced Conc. Pipe	@ \$12.00*	\$1,440.00
			<u>\$6,040.00</u>

Use \$6,040.00

Retaining Walls (See Sketch C)

	Footings Concrete	210 C.Y. @ \$25.00	\$5,250.00
	Stem Concrete	270 C.Y. @ \$60.00	\$16,200.00
	Reinforcing Steel	17,200 Lbs. @ \$0.12	\$2,064.00
	Excavation	1200 C.Y. @ \$2.00	\$2,400.00
			<u>\$25,914.00</u>

Use \$25,914.00

GRAND TOTAL 10 E & C \$11,600.00

Use \$11,600.00

R-524 (Special)

* \$12.00 represents average cost per linear foot - allowing for ground water and deep cut.

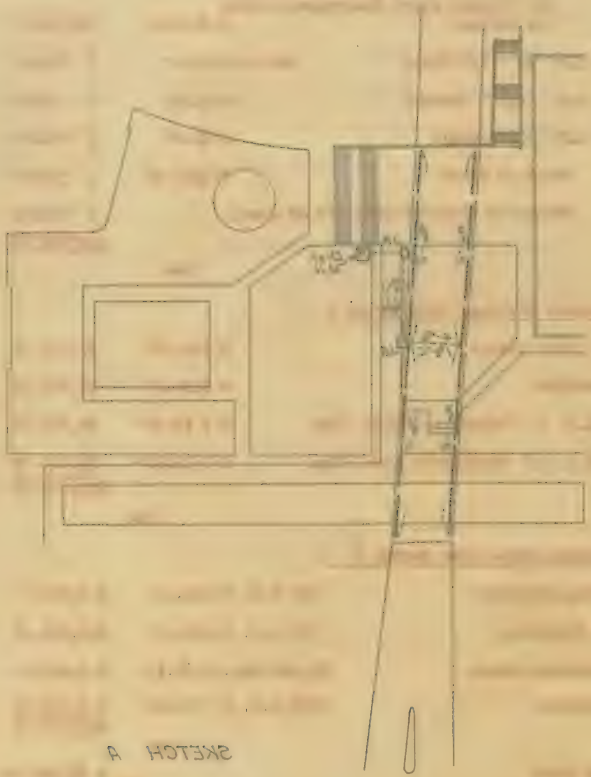
LOCATION _____

ACTIV. NO. 181

SUBJECT *Underpass (New Congress Street)*

SKETCH A

PROJECT NO.	DATE	LOCATION	ENGINEER	CLIENT	ACTIVITY	REMARKS



SKETCH A

COMP. BY J.P.W.
CHECK BY _____
ACTIV. NO. _____

CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET _____ OF _____
DATE 6-29-61
LOCATION _____

SUBJECT Pedestrian Overpass (City Hall)

Cobblestone Paving

$$\text{Surface Area } 50' \times 135' = 6,750 \text{ S.F.}$$

$$\frac{80+135}{2} \times 50 = 5,375$$

$$\frac{70+125}{2} \times 55 = 5,362$$

$$30 \times 125 = 3,750$$

$$15 \times 25 = 375$$

$$25 \times 40 = 1,000$$

$$23,612 \text{ S.F.} \times \frac{1}{8} = 2,951 \text{ S.F.}$$

Say 2,750 S.F.

Granite Block Walks

$$\text{Surface Area } 85' \times 135' = 11,475 \text{ S.F.}$$

$$15 \times 190 = 2,850$$

$$10 \times 425 = 4,250$$

$$25 \times 30 = 750$$

$$19,325 \text{ S.F.} \times \frac{1}{8} = 2,415 \text{ S.F.}$$

Say 2,250 S.F.

Lighting (See Sketch)

Single Unit Standards

8 Each

Multiple Unit Standards

2 Each

#4 - 3/4 Cable

1,800 L.F.

Photo Cells

2 Each

Relays

2 Each

1/2" Conduit

500 L.F.

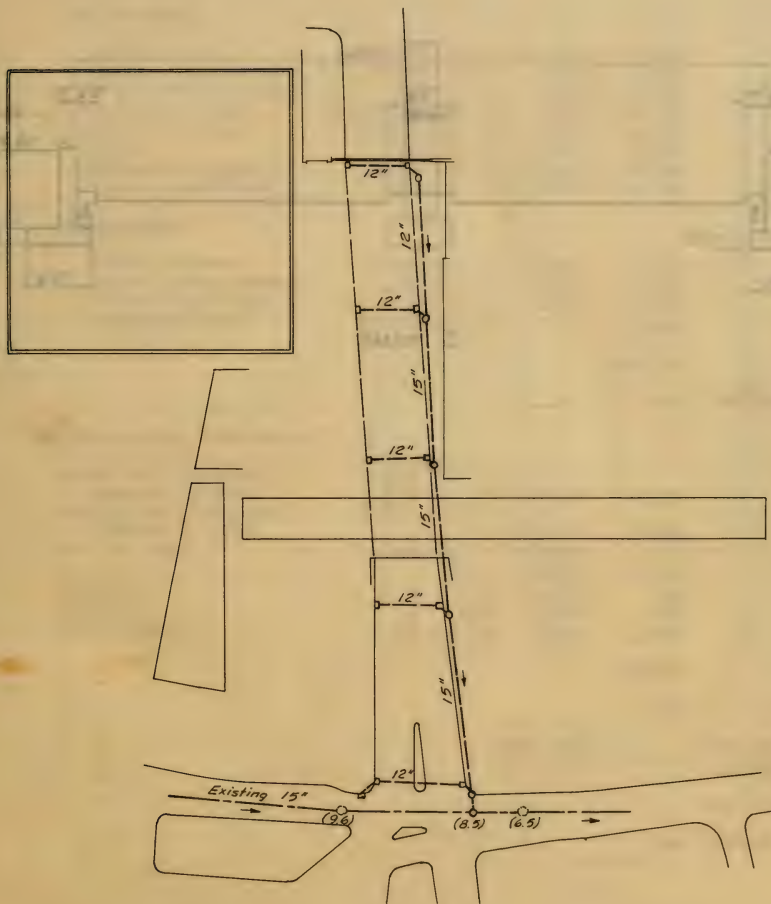
COMP. BY P.J.D.
CHECK BY S.P.M.
ACTIV. NO. 181

CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET _____ OF _____
DATE _____
LOCATION _____

SUBJECT Underpass (New Congress Street)

Drainage



SKETCH B

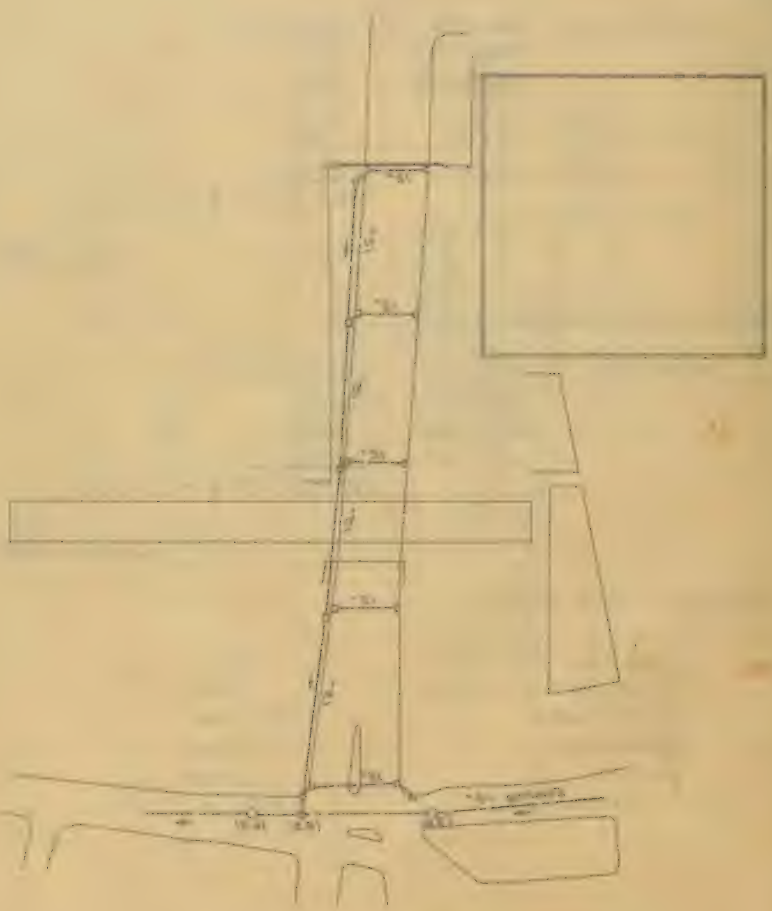
STREET _____
 DATE _____
 LOCATION _____

CLARKSON ENGINEERING CO., INC.
 ENGINEERS

DRAWN BY E.S.D.
 CHECK BY E.S.M.
 ACT. NO. 181

SUBJECT: Underpass (over Highway 200)

(North)



SKETCH 2

COMP. BY.....

CHECK BY.....

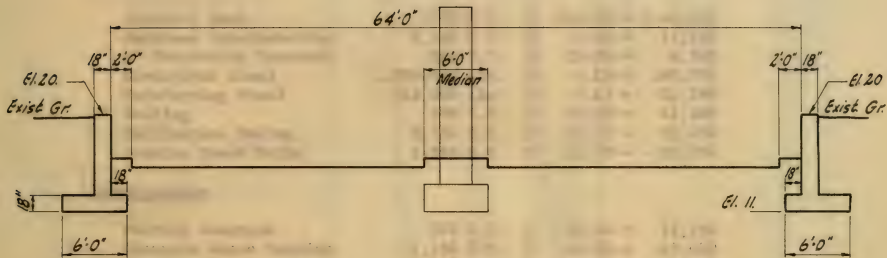
ACTIV. NO.

CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET _____ OF _____

DATE 29 Jun 61

LOCATION.....

SUBJECT Underpass (New Congress Street)

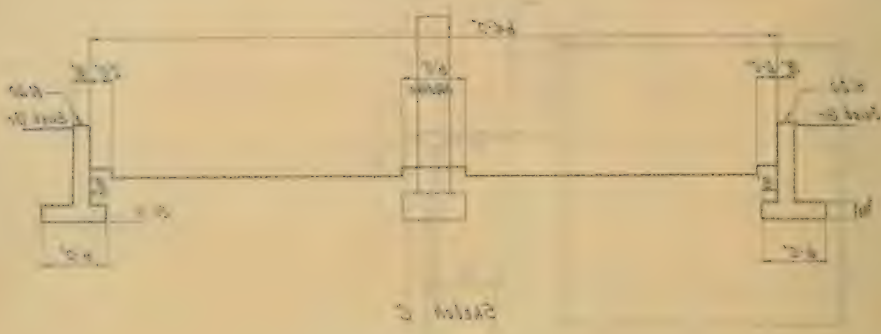
Sketch C

SHEET _____
JOB _____
DATE 12-20-51
LOCATION _____

CLARKSON ENGINEERING CO., INC.
CHICAGO

COMP. BY _____
CHECK BY _____
ACTV. NO. _____

SUBJECT: WINDUPT (See Chapter 24)



PEDESTRIAN OVERPASS (CITY HALL)

Overpass Structure (See Sketch D)

Superstructure

Concrete Deck	770 C.Y.	@	\$60.00 =	\$ 46,200
Membrane Waterproofing	4,700 S.Y.	@	2.50 =	11,750
2" Protective Concrete	260 C.Y.	@	25.00 =	6,500
Structural Steel	1,200,000 Lbs.	@	0.15 =	180,000
Reinforcing Steel	263,000 Lbs.	@	0.13 =	34,190
Railing	700 L.F.	@	16.00 =	11,200
Cobblestone Paving	2,750 S.Y.	@	12.00 =	33,000
Granite Block Walks	2,250 S.Y.	@	15.00 =	33,750

Substructure

Footing Concrete	510 C.Y.	@	25.00 =	12,750
Concrete above Footing	1,150 C.Y.	@	60.00 =	69,000
Concrete for Stairs	150 C.Y.	@	75.00 =	11,250
Reinforcing Steel	258,000 Lbs.	@	0.13 =	<u>33,540</u>

\$484,130

Use: \$485,000

Overpass Lighting (See Sketch E)

Single Unit Standards, Complete in Place	8	@	500.00 =	4,000
Multiple Unit Standards, Complete in Place	2	@	2500.00 =	5,000
#4 - 2/C Cable	1,800 L.F.	@	709.00/	
			1000' =	1,276
Photocells	2	@	25.00 =	50
Relays	2	@	60.00 =	120
1-1/2" Conduit	500 L.F.	@	1.30 =	<u>650</u>

\$11,096

Use: \$ 11,100

GRAND TOTAL \$496,100
10% E. & C. 49,610

\$545,710

Use: \$546,000

Use: \$246,000

\$242,710

GRAND TOTAL
10% E. & C. \$49,610

Use: \$ 11,100

\$11,096

200 L.F. @ 1.30 = 260

2 @ 60.00 = 120

2 @ 25.00 = 50

1000' = 1,276

1,800 L.F. @ 709.00\

2 @ 2500.00 = 5,000

4,000 @ 200.00 = 800,000

1-1/2" Concrete
Reinforcing Steel
Posttensioning
Multiple Unit Standards,
Complete in Place
Single Unit Standards,
Complete in Place

Overpass Lighting (See Sketch B)

Use: \$482,000

\$484,130

228,000 Lbs. @ 0.13 = 29,640

120 C.Y. @ 75.00 = 9,000

1,120 C.Y. @ 60.00 = 67,200

210 C.Y. @ 25.00 = 5,250

Maintaining Steel
Concrete for Rails
Concrete above Footing
Footing Concrete

Substructure

2,520 S.Y. @ 12.00 = 30,240

2,120 S.Y. @ 12.00 = 25,440

100 L.F. @ 16.00 = 1,600

303,000 Lbs. @ 0.13 = 39,390

1,100,000 Lbs. @ 0.12 = 132,000

200 C.Y. @ 25.00 = 5,000

4,100 S.Y. @ 2.50 = 10,250

170 C.Y. @ 260.00 = 44,200

Concrete Deck
Concrete above Footing
Footing Concrete
Maintaining Steel
Reinforcing Steel
2" Protection Concrete
Multiple Unit Standards,
Complete in Place

Superstructure

Overpass Structure (See Sketch D)

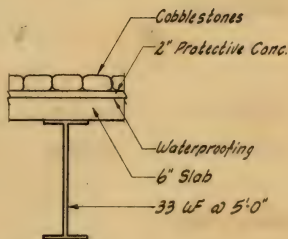
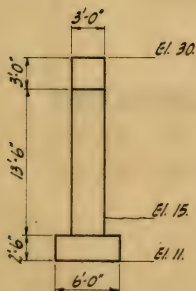
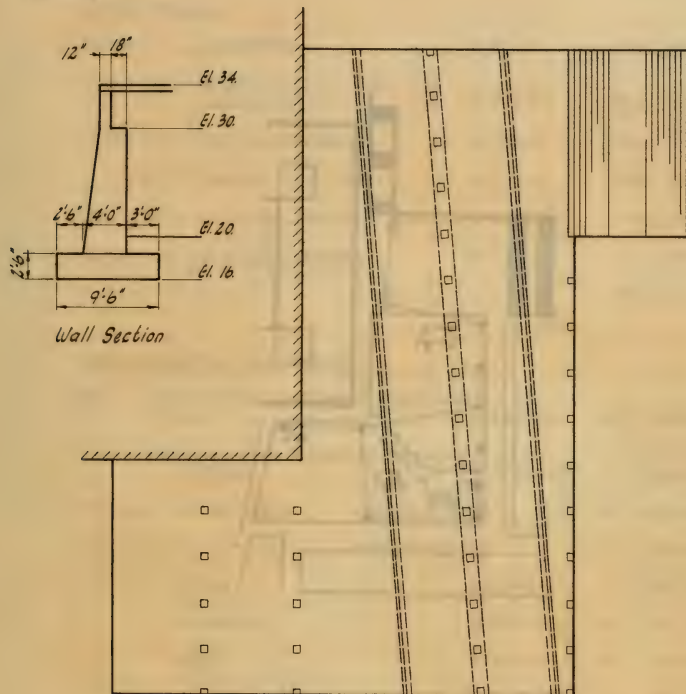
PEDESTRIAN OVERPASS (CITY HALL)

COMP. BY _____
 CHECK BY _____
 ACTIV. NO. _____

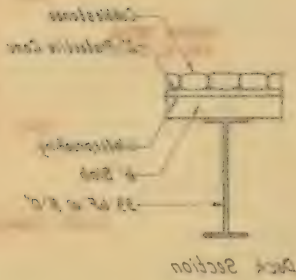
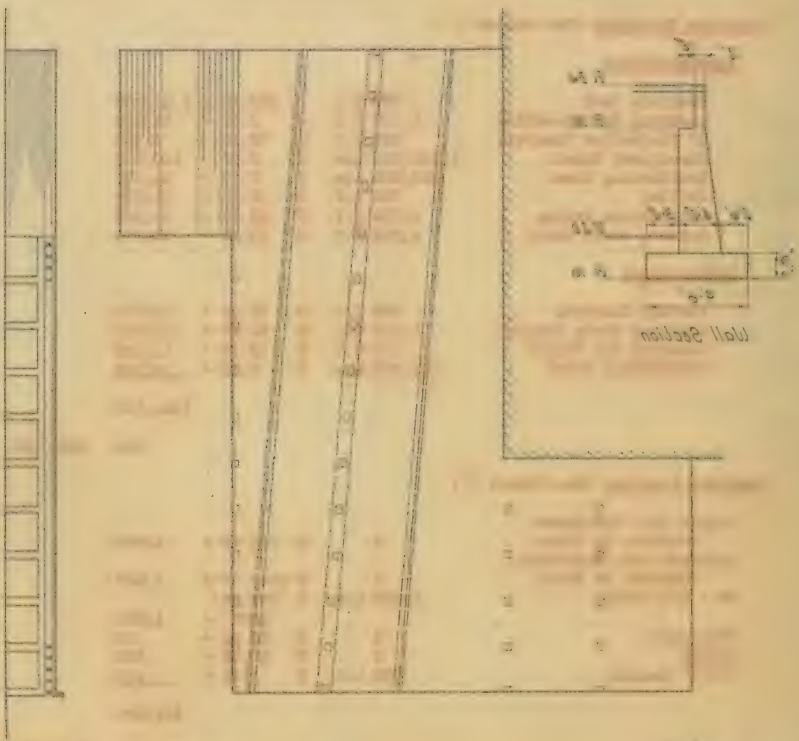
CLARKESON ENGINEERING CO., INC.
 ENGINEERS

SHEET _____ OF _____
 DATE 29 Jun 61
 LOCATION _____

SUBJECT Pedestrian Overpass (City Hall)



Sketch D



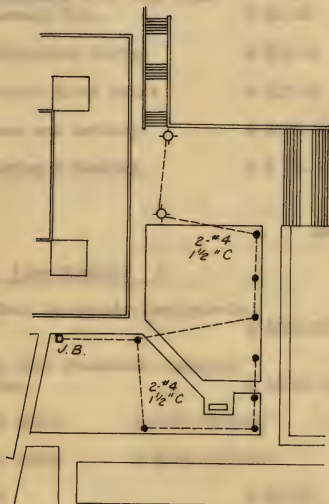
COMP. BY P.J.D.
CHECK BY F.E.K.
ACTIV. NO. 181

CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET _____ OF _____
DATE _____
LOCATION _____

SUBJECT Pedestrian Overpass (City Hall)

Lighting



SKETCH E



SECTION 3

GOVERNMENT CENTER COMMONCommon Grading

46,500 C.Y.	Embankment	@ \$1.00	\$ 46,500.00	
10,800 C.Y.	Embankment over City Hall Basement Ext.	@ \$1.00	\$ 10,800.00	
20,500 S.Y.	Cobblestone Paving	@ \$12.00	\$246,000.00	
9,500 S.Y.	Granite Block Walks	@ \$15.00	\$142,500.00	
85	Each Trees and Setting	@ \$500.00	\$ 42,500.00	
6,900 S.Y.	Loaming & Seeding	@ \$ 0.50	\$ 3,450.00	
			<u>\$491,750.00</u>	
		Use		\$492,000.00

Common Lighting (See Sketch F)

42	Single Unit Standards-Complete-in-Place	@ \$500.00	\$ 21,000.00	
2	Multiple Unit Standards-Complete-in-Place	@ \$2500.00	\$ 5,000.00	
3800 L.F.	#4 2/C Cable	@ \$709.00/1000'	\$ 2,694.20	
2000 L.F.	#6 2/C Cable	@ \$642.00/1000'	\$ 1,284.00	
6000 L.F.	Trench	@ \$0.25	\$ 1,500.00	
7	Photocells	@ \$25.00	\$ 175.00	
7	Relays	@ \$60.00	\$ 420.00	
2	Junction Boxes	@ \$150.00	\$ 300.00	
1	Distribution Manhole	@ \$1500.00	\$ 1,500.00	
			<u>\$ 33,873.20</u>	
		Use		\$34,000.00

Common Drainage (See Sketch G)

1650 L.F.	12" Reinf. Conc. Pipe	@ \$4.00	\$ 6,600.00	
150 L.F.	15" Reinf. Conc. Pipe	@ \$4.50	\$ 675.00	

625 L.F. 18" Reinf. Conc. Pipe	@ \$5.50	\$ 3,437.50	
450 L.F. 24" Reinf. Conc. Pipe	@ \$8.00	\$ 3,600.00	
40 Inlets	@ \$200.00	\$ 8,000.00	
10 Manholes	@ \$250.00	\$ 2,500.00	
1100 L.F. 10" Sub-drain	@ \$4.50	\$ 4,950.00	
900 L.F. Grating	@ \$4.00	\$ 3,600.00	
		<u>\$33,362.50</u>	
	Use		\$33,500.00

Retaining Wall (See Sketch H)

Footing Concrete	720 C.Y.	@ \$25.00	\$18,000.00	
Stem Concrete	1020 C.Y.	@ \$60.00	\$61,200.00	
Reinforcing Steel	261,000 Lbs.	@ \$0.13	\$33,930.00	
Excavation	2100 C.Y.	@ \$2.00	\$ 4,200.00	
Sheeting			\$ 5,000.00	
			<u>\$122,330.00</u>	
		Use		\$123,000.00
GRAND TOTAL			\$ 682,500.00	
+10% E & C			<u>68,250.00</u>	
			750,750.00	
		Use		\$751,000.00

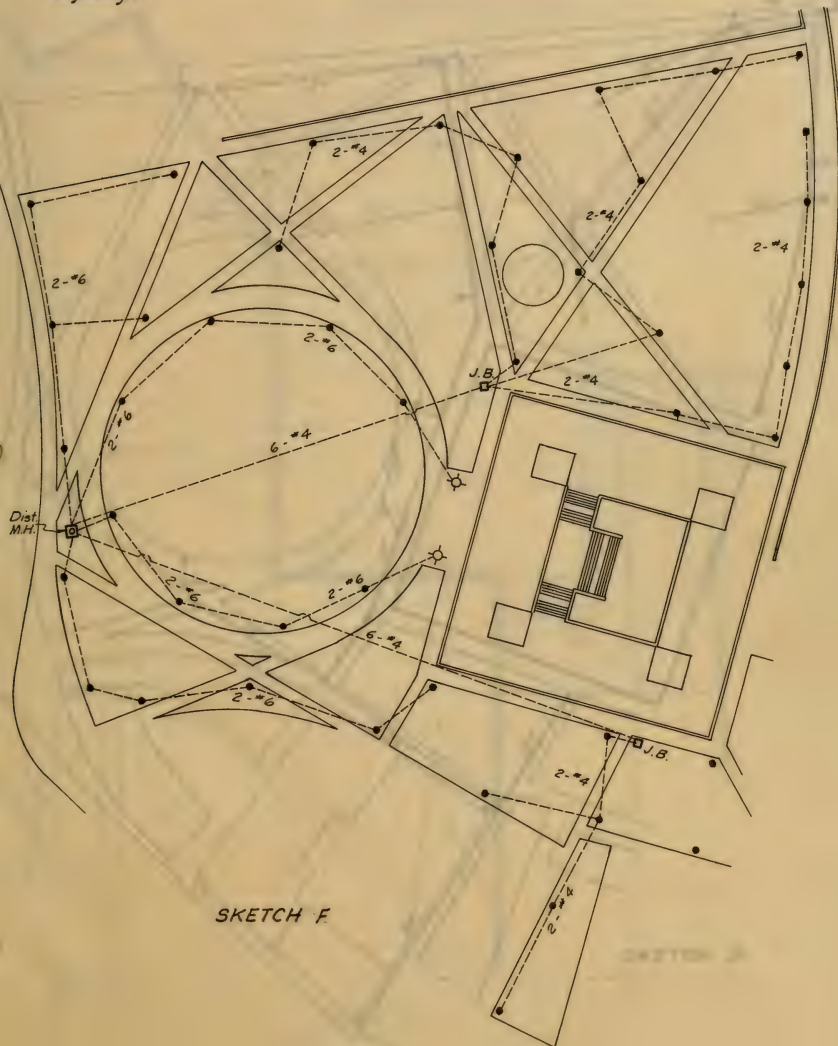
COMP. BY P.J.D.
CHECK BY F.E.K.
ACTIV. NO. 181

CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET _____ OF _____
DATE _____
LOCATION _____

SUBJECT Government Center Common

Lighting





SKETCH F

COMP. BY P.J.D.
CHECK BY S.P.M.
ACTIV. NO. 181

CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET _____ OF _____
DATE _____
LOCATION _____

SUBJECT Government Center Common

Drainage



SKETCH G

DRAWING NO. 181
 SHEET NO. 3 OF 3
 PROJECT: CARRISON ENGINEERING CO. INC.
 LOCATION: _____
 DATE: _____
 SUBJECT: CARRISON ENGINEERING COMPANY



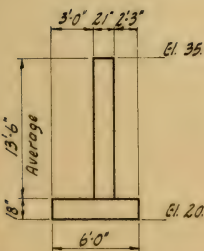
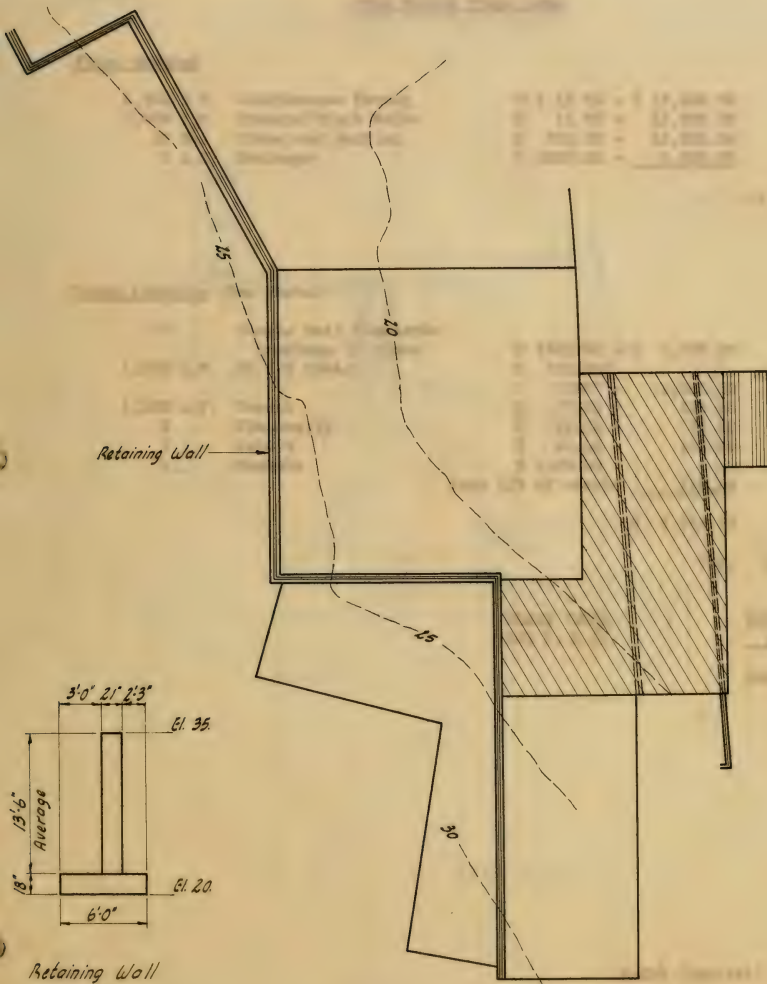
SKETCH 6

COMP. BY _____
CHECK BY _____
ACTIV. NO. _____

CLARKESON ENGINEERING CO., INC.
ENGINEERS

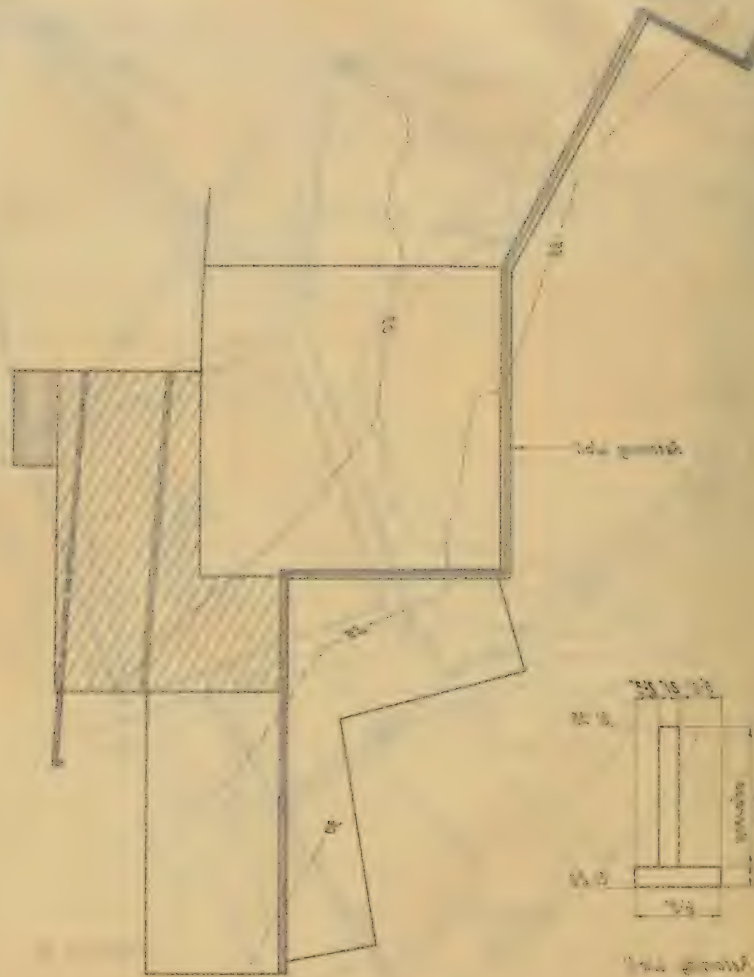
SHEET _____ OF _____
DATE 29 Jun 61
LOCATION _____

SUBJECT Government Center Common



Retaining Wall
Section

Sketch H



Section 1

Section 2

DOCK SQUARE PLAZA AREA

Plaza Grading

6,500 S.Y.	Cobblestone Paving	@ \$ 12.00 =	\$ 78,000.00
1,400 S.Y.	Granite Block Walks	@ 15.00 =	21,000.00
30 Ea.	Trees and Setting	@ 500.00 =	15,000.00
1 L.S.	Drainage	@ 5000.00 =	<u>5,000.00</u>

\$119,000.00

Plaza Lighting (See Sketch J)

15	Single Unit Standards -		
	Complete in Place	@ \$500.00 =	\$ 7,500.00
1,500 L.F.	#6 2/C Cable	@ 709.00/	
		1000' =	1,063.50
1,500 L.F.	Trench	@ 0.25 =	375.00
3	Photocells	@ 25.00 =	75.00
3	Relays	@ 60.00 =	180.00
1	Manhole	@ 1500.00	
	(use 1/2 of cost)=		<u>750.00</u>

\$ 9,943.50

Use: 10,000.00

GRAND TOTAL	\$129,000.00
10% E. & C.	<u>13,000.00</u>

\$142,000.00

DOCK SQUARE PLAZA AREA

Item Quantities

6,500 S.Y.	Cobblestone Paving	@ \$ 12.00 = \$ 78,000.00
1,400 S.Y.	Granite Black Waikie	@ 12.00 = 21,000.00
30 Ea.	Grass and Seeding	@ 200.00 = 12,000.00
1 L.S.	Drainage	@ 2000.00 = 2,000.00

\$113,000.00

Time Estimate (See Sketch 1)

12	Single Unit Standards -	@ \$200.00 = \$ 7,200.00
1,500 L.F.	Complete in Place	@ 700.00\
	4 1/2" R/C Curb	1000' = 1,000.00
1,200 L.F.	Trench	@ 0.25 = 275.00
3	Photocopy	@ 22.00 = 72.00
3	Relays	@ 40.00 = 120.00
1	Manhole	@ 1200.00
	(use 1/2 of cost)	250.00

\$ 8,043.20

Use: 16,000.00

GRAND TOTAL
107 S. & C. 13,000.00

\$143,000.00

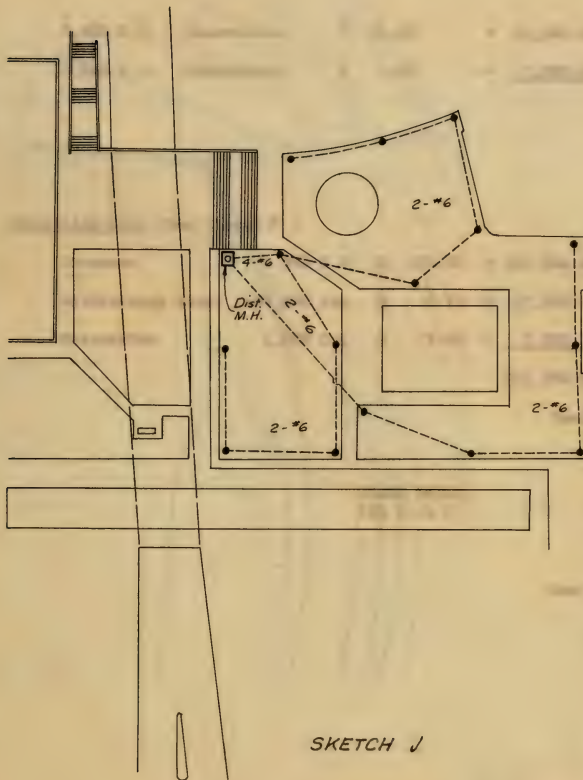
COMP. BY P.J.D.
CHECK BY F.E.K.
ACTIV. NO. 181

CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET _____ OF _____
DATE _____
LOCATION _____

SUBJECT Dock Square Plaza Area

Lighting



SKETCH J

COMPL. BY	DATE	CLARKESON ENGINEERING CO., INC.	PROJECT NO.
CHECK BY	LOCATION		
ACTV. NO.			
SUBJECT: Dock Square Plaza Area			



SKETCH 1

PEMBERTON SQUARE GRADING

2,900 C.Y.	Excavation	@ \$1.00	= \$2,900.00
5,200 C.Y.	Embankment	@ 1.00	= <u>5,200.00</u>
			\$8,100.00

Retaining Wall (See Sketch K)

Concrete	900 C.Y.	@ \$50.00	= \$45,000.00
Reinforcing Steel	135,000 Lbs.	@ 0.13	= 17,550.00
Excavation	1,600 C.Y.	@ 2.00	= <u>3,200.00</u>
			\$65,750.00

Use: \$66,000.00

GRAND TOTAL	\$74,100.00
10% E. & C.	<u>7,410.00</u>

\$81,510.00

Use: \$82,000.00

REVENUE STATEMENT

2,500 C.Y. Excavation	@ 1.00	=	\$2,500.00
2,500 C.Y. Embankment	@ 1.00	=	<u>2,500.00</u>
			\$5,000.00

Material List (See Section 2)

Concrete	200 C.Y. @ \$20.00	=	\$4,000.00
Reinforcing Steel	125,000 Lbs. @ 0.12	=	15,000.00
Excavation	1,400 C.Y. @ 2.00	=	<u>2,800.00</u>
			\$21,800.00
Less:			<u>\$66,000.00</u>

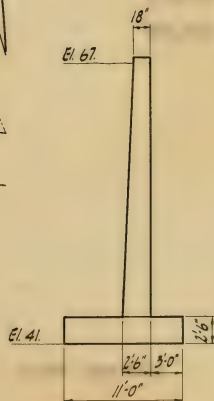
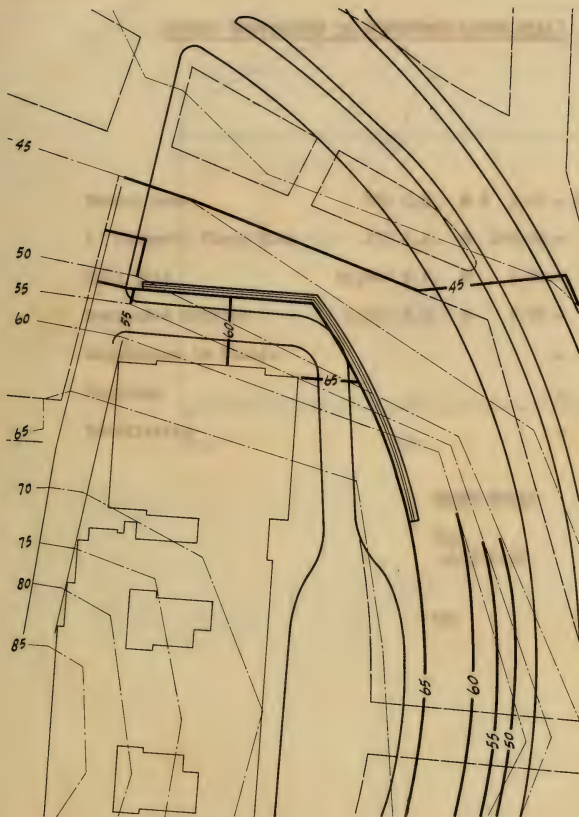
GRAND TOTAL	10X 2.5 C.
\$21,800.00	
\$21,800.00	
\$21,800.00	

COMP. BY _____
CHECK BY _____
ACTIV. NO. _____

CLARKESON ENGINEERING CO., INC.
ENGINEERS

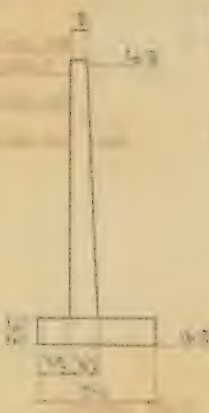
SHEET _____ OF _____
DATE 27 Nov 21
LOCATION _____

SUBJECT Pemberton Square Grading



Sketch K

Retaining Wall Section



Sheet 1

SUBWAY CONVERSION TO CONCOURSE (CORN HILL) (See Sketch L)

Gravel Base	800 C.Y.	@ \$ 3.00 =	\$ 2,400.00
4" Concrete Floor Slab	135 C.Y.	@ 100.00 =	13,500.00
Wall Tile	10,800 S.F.	@ 3.00 =	32,400.00
Suspended Ceiling	1,200 S.Y.	@ 7.00 =	8,400.00
Alteration to Stairs		=	5,000.00
Lighting		=	7,000.00
Ventilating		=	<u>5,000.00</u>

GRAND TOTAL	\$73,700.00
-------------	-------------

Use	\$74,000.00
+10% E & C	7,400.00
	<u>\$81,400.00</u>

Use	\$82,000.00
-----	-------------

QUANTIFICATION TO COMPOUND (CON. LIST) (See Sketch 1)

000 C.Y. @ \$ 3.00 = \$ 3,000.00	Gravel Base
132 C.Y. @ 100.00 = 13,200.00	4" Concrete Floor Slab
10,000 S.F. @ 3.00 = 30,000.00	Wall Tile
1,200 S.F. @ 7.00 = 8,400.00	Suspended Ceiling
2,000.00 @	Aluminum Joist
7,000.00 @	Electric
2,000.00 @	Ventilation

\$12,700.00

GRAND TOTAL

\$12,700.00

Use

7,400.00

100% S. 40

22,100.00

\$22,100.00

Use

COMP. BY _____

CHECK BY _____

ACTIV. NO. _____

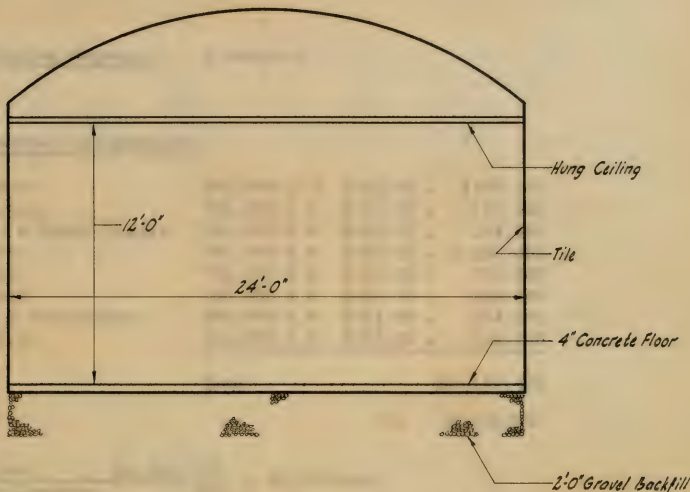
CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET _____ OF _____

DATE *29 Jun 61*

LOCATION _____

SUBJECT *Subway Conversion to Concourse (Corn Hill)*



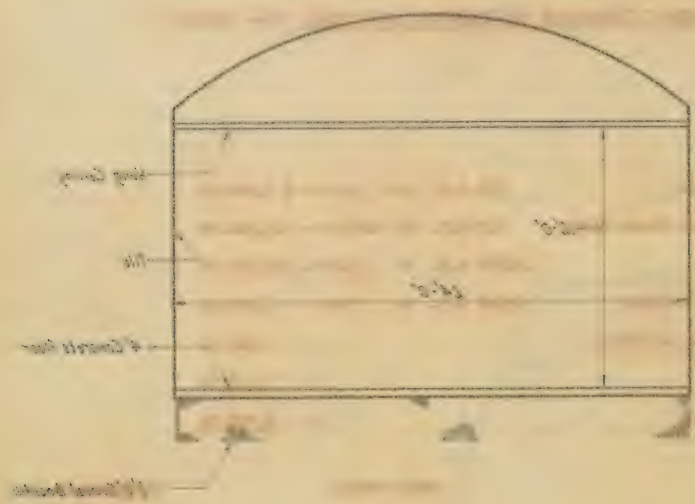
Sketch L

SHEET _____ OF _____
 DATE 09/01/04
 LOCATION _____

CLARKSON ENGINEERING CO., INC.
 ENGINEERS

DRAWN BY _____
 CHECK BY _____
 ACTY. NO. _____

SUBJECT: Bridge Construction & Maintenance (10/1/04)



Sheet 1 of 1

PUBLIC PARKING GARAGE (See Sketch M)

Total Parking Capacity: 1,984 cars

Construction Cost Estimate:

Excavation:	100,630 C.Y. @ \$1.00 =	\$100,630
Foundations:	756,000 S.F. @ \$0.25 =	189,000
Masonry & Other Trades:	756,000 S.F. @ \$0.21 =	164,000
Structure:	756,000 S.F. @ \$6.00 =	4,536,000
Plumbing:	756,000 S.F. @ \$0.50 =	378,000
Electrical:	756,000 S.F. @ \$0.50 =	378,000
Heating & Ventilation:	264,000 S.F. @ \$1.00 =	264,000
Sprinklers:	264,000 S.F. @ \$0.50 =	132,000

Total \$6,141,630

Use \$6,142,000

Total Cost: \$6,141,630
Parking Capacity: 1,984 = \$3,096/car

Gross Floor Area: 756,000 sq.ft. = 381 gross sq.ft. /car
Parking Capacity: 1,984

Parking Capacity: 1,984
Gross Floor Area: 756,000 sq. ft. = 381 gross sq. ft./car

Parking Capacity: 1,984
Total Cost: \$6,141,630 = \$3,096/car

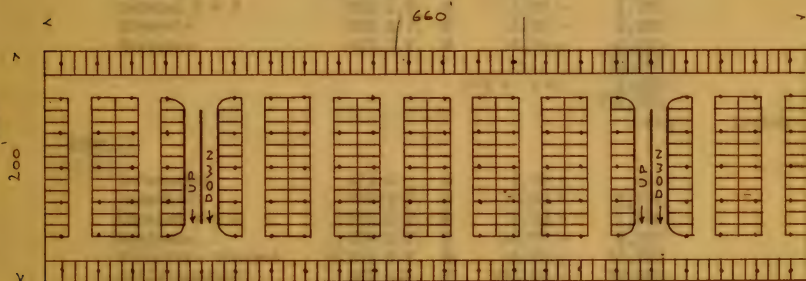
Use \$6,145,000

Total \$6,141,630

Sprinklers:	264,000 S.F. @ \$0.50 =	132,000
Heating & Ventilation:	264,000 S.F. @ \$1.00 =	264,000
Electrical:	756,000 S.F. @ \$0.50 =	378,000
Plumbing:	756,000 S.F. @ \$0.50 =	378,000
Structures:	756,000 S.F. @ \$6.00 =	4,536,000
Masonry & Other Trades:	756,000 S.F. @ \$0.21 =	164,000
Foundations:	756,000 S.F. @ \$0.25 =	189,000
Excavation:	100,630 C.Y. @ \$1.00 =	\$100,630

Construction Cost Estimate:

Total Parking Capacity: 1,984 cars



BOSTON GOVERNMENT CENTER PARKING GARAGE
SCALE : 1" = 100'

CENTRAL ARTERY INTERCHANGE ADJUSTMENTS

Ramp A1

Excavation	650 C.Y.	@ \$ 1.00 =	\$ 650
Pavement	1,300 S.Y.	@ 3.50 =	4,550
Curbing R & R	750 L.F.	@ 2.00 =	1,500
Sidewalk	150 S.Y.	@ 5.00 =	750
Drainage	430 L.F.	@ 10.00 =	4,300
New Structure	35,500 S.F.	@ 20.00 =	710,000
			721,750
		Use:	722,000
		10% E. & C.	72,200
			\$794,200

Use: \$795,000

Ramp B

Excavation	575 C.Y.	@ 1.00 =	575
Pavement	1,150 S.Y.	@ 3.50 =	4,025
Curbing R & R	850 L.F.	@ 2.00 =	1,700
Sidewalk	300 S.Y.	@ 5.00 =	1,500
Drainage	420 L.F.	@ 10.00 =	4,200
			12,000
		10% E. & C.	1,200
			\$13,200

Use: 13,500

Ramp F1

Excavation	475 C.Y.	@ 1.00 =	475
Pavement	950 S.Y.	@ 3.50 =	3,325
Curbing R & R	650 L.F.	@ 2.00 =	1,300
Drainage	320 L.F.	@ 10.00 =	3,200
Structure Removed	9,240 S.F.	@ 3.00 =	27,720
Walls Removed	300 L.F.	@ 132.00 =	39,600
*New Structure	9,240 S.F.	@ *10.00 =	92,400
New Walls	300 L.F.	@ 230.00 =	69,000
			237,020
		Use:	237,000
		10% E. & C.	23,700
			\$260,700

Use: 261,000

*Some existing structural steel to be re-used.

CENTRAL ARMY INTELLIGENCE BUREAU

Page 1

Excavation	420 C.Y.	@	1.00 =	\$ 420
Pavement	1,200 S.Y.	@	3.50 =	4,200
Grading & H	120 L.F.	@	2.00 =	2,400
Sidewalk	120 S.Y.	@	2.00 =	240
Drainage	420 L.F.	@	10.00 =	4,200
New Structure	12,200 S.F.	@	20.00 =	244,000
				<u>251,240</u>
Use:				251,240
10% R. & C.				<u>25,124</u>
				\$276,364

\$276,364

Page 2

Excavation	272 C.Y.	@	1.00 =	\$ 272
Pavement	1,120 S.Y.	@	3.50 =	3,920
Grading & H	820 S.F.	@	2.00 =	1,640
Sidewalk	200 S.Y.	@	2.00 =	400
Drainage	420 L.F.	@	10.00 =	4,200
				<u>10,432</u>
Use:				10,432
10% R. & C.				<u>1,043</u>
				\$11,475

\$11,475

Page 3

Excavation	472 C.Y.	@	1.00 =	\$ 472
Pavement	920 S.Y.	@	3.50 =	3,220
Grading & H	420 L.F.	@	2.00 =	840
Drainage	120 L.F.	@	10.00 =	1,200
Structure removed	2,240 S.F.	@	3.00 =	6,720
Walls removed	200 L.F.	@	122.00 =	24,400
New Structure	2,240 S.F.	@	*10.00 =	22,400
New Walls	200 L.F.	@	120.00 =	24,000
				<u>62,000</u>
Use:				62,000
10% R. & C.				<u>6,200</u>
				\$68,200

\$68,200

*Some existing structural steel to be re-used.

Ramp G1

Excavation	1,050 C.Y.	@	\$ 1.00 =	\$ 1,050
Pavement	2,100 S.Y.	@	3.50 =	7,350
Curbing (new)	1,250 L.F.	@	4.00 =	5,000
Drainage	630 L.F.	@	10.00 =	6,300

19,700

Use 20,000

10% E & C 2,000

22,000

Use: \$22,000

Ramp H1

Structure Removed	11,550 S.F.	@	3.00 =	34,650
Walls Removed	320 L.F.	@	132.00 =	42,240
* New Structure	11,550 S.F.	@	10.00 =	115,500
New Walls	320 L.F.	@	230.00 =	73,600

265,990

Use 266,000

10% E & C 26,600

292,600

Use: \$293,000

Ramp J1

Excavation	1,150 C.Y.	@	1.00 =	1,150
Pavement	2,300 S.Y.	@	3.50 =	8,050
Curbing R & R	1,150 L.F.	@	2.00 =	2,300
Sidewalk	200 S.Y.	@	5.00 =	1,000
Drainage	625 L.F.	@	10.00 =	6,250

18,750

Use 19,000

10% E & C 1,900

20,900

Use: \$ 21,000

Ramp K1(Blackstone St.)

Pavement	150 S.Y.	@	3.50 =	525
Excavation	75 C.Y.	@	1.00 =	75
Curbing R & R	350 L.F.	@	2.00 =	700
Drainage	350 L.F.	@	10.00 =	3,500

4,800

Use 5,000

10% E. & C 500

5,500

Use: \$ 6,000

* Some existing structural steel to be removed.

R-224 (Special)

Ramp L

Structure Removed	9,900 S.F.	@ \$ 3.00 =	\$ 29,700
Walls Removed	300 L.F.	@ 132.00 =	39,600
			<u>69,300</u>
		10% E & C	6,930
			<u>76,230</u>

Use: \$ 77,000

Ramp M1

New Structure	3,300 S.F.	@ 20.00 =	66,000
Walls Removed	100 L.F.	@ 132.00 =	13,200
			<u>79,200</u>
		10% E & C	7,920
			<u>87,120</u>

Use: \$ 88,000

Ramp N1

New Structure	10,230 S.F.	@ 20.00 =	204,600
Walls Removed	270 L.F.	@ 132.00 =	35,640
			<u>240,240</u>
		Use	241,000
		10% E & C	24,100
			<u>265,100</u>

Use: \$ 266,000

Ramp O1

Widen Existing Structure	13,050 S.F.	@ 20.00 =	261,000
		10% E & C	26,100
			<u>287,100</u>

Use: \$ 288,000

Январь I

Walls Removed
Structure Removed

16,530	108 88 C	28,300	300 L.F.	2,000 E.F.	\$ 3.00 =	\$ 52,100
28,300		28,300				
16,530		28,300				
16,530		28,300				

Use: \$ 77,000

11. 12. 1951

Walls Removed
New Structure

81,750		100 I.F.	@	135.00 =	13,500
<u>1,250</u>					
1,250					
13,500					
82,000					

000,88 \$: call

Рамп И

New Structure
Walls Removed

[illegible]

U8e: \$ 500,000

REMARKS

Widened Existing Structure

13,020 27. @	50.00 =	587,000
104 1/2 c	50,000	587,000
		<u>587,000</u>

Use: \$ 88,000

Roadway Approaches to Tunnel

Excavation	600 C.Y.	@ \$	1.00 =	\$ 600
Pavement	1,200 S.Y.	@	3.50 =	4,200
Curbing R & R	500 L.F.	@	2.00 =	1,000
Curbing (new)	1,000 L.F.	@	4.00 =	4,000
Sidewalks	700 S.Y.	@	5.00 =	3,500
Drainage	1 L.S.			<u>5,000</u>
				18,300
		Use		18,500
		10% E & C		<u>1,850</u>
				20,350

Use: \$ 20,500

Washington St. South

Excavation	675 C.Y.	@	1.00 =	675
Pavement	1,350 S.Y.	@	3.50 =	4,725
Curbing R & R	600 L.F.	@	2.00 =	1,200
Drainage	400 L.F.	@	10.00 =	<u>4,000</u>
				10,600
		Use		11,000
		10% E & C		<u>1,100</u>
				12,100

Use: 12,000

Artery Down Ramp to Chardon St.

Excavation	400 C.Y.	@	1.00 =	400
Pavement	800 S.Y.	@	3.50 =	2,800
Curbing R & R	400 L.F.	@	2.00 =	800
Drainage	240 L.F.	@	10.00 =	<u>2,400</u>
				6,400
		Use		6,500
		10% E & C		<u>650</u>
				7,150

Use: 7,500

Lighting and Signs

100,000
10% E & C
<u>10,000</u>
110,000

Use: 110,000

GRAND TOTAL 2,375,500

USE: 2,375,000

USE: \$375,000

GRAND TOTAL \$375,000

USE: \$10,000

10% B & C
\$10,000
\$10,000

Lighting and Signs

1,150

10% B & C
USE

6,800

6,800

2,800

400

Widening Down Ramp to Charlton St.

Drainage
Curb and R
Pavement
Excavation

240 L.F.
400 L.F.
800 S.Y.
400 C.Y.

10.00 =
2.00 =
3.50 =
1.00 =

6,800
800
2,800
400

USE:

1,500

Widening S.E. South

Drainage
Curb and R
Pavement
Excavation

400 L.F.
600 L.F.
1,350 S.Y.
675 C.Y.

10.00 =
2.00 =
3.50 =
1.00 =

4,000
1,200
4,725

USE:

15,000

10% B & C
USE

2,100

10,000

1,500

1,200

875

USE:

\$20,500

10% B & C
USE

1,850

16,500

3,000

4,000

1,000

1,000

Widening Approach to Tunnel

Drainage
Sidewalks
Curb and R
Pavement
Excavation

1 L.S.
700 S.Y.
1,000 L.F.
500 L.F.
1,200 S.Y.
600 C.Y.

1.00 =
2.00 =
4.00 =
2.00 =
3.50 =
1.00 =

1,000
7,000
4,000
1,000
4,200
600

CENTRAL ARTERY INTERCHANGE ADJUSTMENTS - INTERIM COSTS

250 C.Y.	Excavation	@ \$1.00	\$ 250.00
500 S.Y.	Pavement	@ \$3.50	\$1,750.00
800 L.F.	Curbing R & R	@ \$2.00	\$1,600.00
300 S.Y.	Sidewalks	@ \$5.00	\$1,500.00
			<hr/>
			\$5,100.00
		10% E. & C.	<hr/>
			500.00
			<hr/>
			\$5,600.00

Use: \$6,000.00

CENTRAL ARMY INTERCHANGE ADJUSTMENTS - INTERIM COSTS

300 C.Y.	Excavation	\$ 1.00	\$ 320.00
200 S.Y.	Fillwork	\$ 2.20	\$ 440.00
200 L.Y.	Grading & H	\$ 5.00	\$ 1,000.00
300 S.Y.	Stonework	\$ 2.00	\$ 600.00
			<hr/>
			\$ 2,100.00
			<hr/>
		10% S. & C.	\$ 200.00
			\$ 2,300.00

Use: \$6,000.00

COMP. BY.....

CHECK BY.....

ACTIV. NO.....

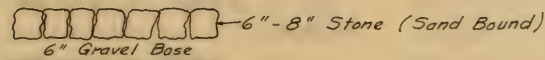
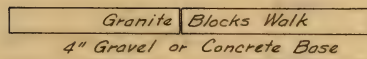
CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET.....OF.....

DATE 6-29-61

LOCATION.....

SUBJECT.....

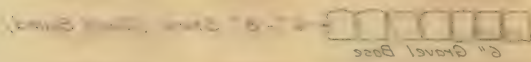
*Typical Cobble Stone Section**Typical Sidewalk Section*

Precast Conc. Block around trees to be 4" thick.

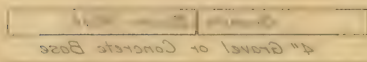
Trees to be 6"-8" in diameter.

Lawn areas to have 4" loam.

Tree price of \$500.00 each includes planting, loaming, and tying down trees and setting decorative block around tree.



Typical Cobble Stone Section



Typical Sidewalk Section

Precast Conc. Block around trees to be 4" thick.

Trees to be 8"-10" in diameter.

Low areas to have 4" form.

Tree price of \$50.00 each includes planting, forming, and tying down trees and setting decorative block around tree.

COMP. BY J.P.W.
CHECK BY _____
ACTIV. NO. 191

CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET _____ OF _____
DATE 12-29-51
LOCATION _____

SUBJECT Underpass (New Congress Street)

Excavation

		Ave.
Sta. 0+00	$90' \times 1.5' = 135 \text{ S.F.}$	
		148 S.F.
1+00	$80' \times 2.0' = 160$	
		325
2+00	$70' \times 7.0' = 490$	
		405
3+00	$64' \times 5.0' = 320$	
		288
4+00	$64' \times 4.0' = 256$	
		224
5+00	$64' \times 3.0' = 192$	
		156
6+00	$80' \times 1.5' = 120$	
		120
7+00	$80' \times 1.5' = 120$	

$$1,666 \text{ S.F.} \times 100' \times \frac{1}{27} = 6,170 \text{ C.Y.}$$

Say 6,200 C.Y.

Drainage (See Sketch)

Catch Basins 11 Each
Manholes 6 Each
12" Reinf. Conc. Pipe 400 L.F.
15" " " " 450 L.F.

COMP. BY J.P.W.

CHECK BY _____

ACTIV. NO. 151CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET _____ OF _____

DATE 6-29-61

LOCATION _____

SUBJECT Under pass (New Congress Street)Lighting (See Sketch)

100w Rapid Start Fluorescent Units with Ballast	56 Each
100w Rapid Start Fluorescent Units no Ballast	56 Each
#6 - 1/2 Cable	2600 L.F.
1 1/2" Conduit	50 L.F.
2" Conduit	150 L.F.
Junction Boxes	2 Each
Manhole (Use 1/2 for cost)	1/2 Each

COMP. BY CLM
CHECK BY _____
ACTIV. NO. _____

CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET _____ OF _____
DATE 1-18-61
LOCATION _____

SUBJECT Waterway (New Concrete Structure)

Retaining Walls 520 Feet

Footing Concrete $1.5 \times 6 \times \frac{1}{27} = 0.33 \text{ cy.} \times 620 = 207 \text{ cy.}$

Stem Concrete $1.5 \times 7.5 \times \frac{1}{27} = 0.42 \text{ cy.} \times 620 = 270 \text{ cy.}$

Reinforcing $477 \times 150 \text{ #/cu.} = 71500 \text{ #}$

Excavation $8 \times 8 \times 620 / 27 = 1470 \text{ c.y.}$

COMP. BY SM
CHECK BY _____
ACTIV. NO. 181

CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET _____ OF _____
DATE 6-28-61
LOCATION _____

SUBJECT _____

PERCEPTEMAN OVERPASS (CITY TALL)

Quantities

Concrete Slab	$(120 \times 280 \times \frac{6}{12} + 80 \times 100 \times \frac{6}{12}) \frac{1}{27} =$	770 c.y.
Membrane	$(120 \times 280 + 80 \times 100) \frac{1}{9} =$	4622 sq.
2" Protection	$770 \times \frac{2}{6} =$	256 c.y.
Railing	$120 + 280 + 200 + 100 =$	700 Lin. Ft.
Structural Steel	$(56 \times 120 + 16 \times 100) 116 \times 1.20 =$	1,158,120 Lbs.
Reinforcing Steel	$6.32 \frac{1}{4} \times 41600 \# =$	263,000 Lbs.

SUBSTRUCTURE

Footing Column Concrete	$35 \times 4 \text{ c.y.} =$	170 c.y.	=
Footing Wall Concrete	$340' \times 1 \text{ c.y.} =$	340 c.y.	510 c.y.
Wall Stem Concrete	$340' \times 2 \text{ c.y.} =$	680 c.y.	
Column Concrete	$35 \times 6 \text{ c.y.} =$	210 c.y.	
Cap Concrete	$780 \text{ Lin. Ft.} \times \frac{1}{3} \text{ c.y.} =$	260 c.y.	1150 c.y.
Reinforcing Steel	$150 \frac{1}{4} \text{ c.y.} \times 1660 =$		248600 #
Excavation: Cols	$35 \times 4' \times 8' \times 8' \times \frac{1}{27} =$	332 c.y.	
Wall	$340' \times 4' \times 11.5' \times \frac{1}{27} =$	580 c.y.	
		912	1000 c.y.
Stair Concrete			150 c.y.
Reinforcing Steel			2500 #

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

COMP. BY J.P.W.
CHECK BY _____
ACTIV. NO. 121

CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET _____ OF _____
DATE 6-2-54
LOCATION _____

SUBJECT Government Center Common

Embarkment

Sta.	P.E.	Ave. P.E.
0+00	10.00	8.86
1+00	7.72	7.75
2+00	7.78	7.44
3+00	7.10	5.89
4+00	4.68	3.88
5+00	3.08	

$$\begin{aligned} 33.82 \times 100 \times 250 \times \frac{1}{87} &= 31,315 \text{ C.Y.} \\ 180 \times 115 \times 8 \times \frac{1}{87} &= 6,133 \\ 200 \times 60 \times 3 \times \frac{1}{87} &= 1,333 \\ &\underline{38,781} \\ +20\% &\underline{7,756} \\ &46,537 \text{ C.Y.} \end{aligned}$$

Say 46,500 C.Y.

Embarkment over St. Mary River, P.E. #

$$\begin{aligned} 300' \times 270' \times 3' \times \frac{1}{87} &= 9,000 \text{ C.Y.} \\ +20\% &\underline{1,800} \\ &10,800 \text{ C.Y.} \end{aligned}$$

Say 10,800 C.Y.

COMP. BY A.P.W.
CHECK BY _____
ACTIV. NO. 121

CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET _____ OF _____
DATE 6-29-61
LOCATION _____

SUBJECT Government Center Common

Cobblestone Paving

Surface Area $125 \times 310 \times \frac{1}{2} = 19,375 \text{ S.F.}$

$80 \times 170 \times \frac{1}{2} = 6,800$

$42 \times 100 \times \frac{1}{2} = 2,100$

$70 \times 180 \times \frac{1}{2} = 6,300$

$55 \times 140 = 7,700$

$70 \times 140 \times \frac{1}{2} = 4,900$

$80 \times 90 \times \frac{1}{2} = 3,600$

$60 \times 125 \times \frac{1}{2} = 3,750$

$15 \times 65 \times \frac{1}{2} = 488$

$80 \times 235 \times \frac{1}{2} = 9,400$

$150 \times 230 \times \frac{1}{2} = 17,250$

$95 \times 165 \times \frac{1}{2} = 7,838$

$115 \times 330 \times \frac{1}{2} = 18,975$

$48 \times 340 = 16,320$

$19 \times 350 \times \frac{1}{2} = 3,325$

$20 \times 40 \times \frac{1}{2} = 400$

$25 \times 25 = 625$

$20 \times 60 \times \frac{1}{2} = 600$

$103 \times 185 \times \frac{1}{2} = 9,528$

$7 \times 25 \times \frac{1}{2} = 88$

$30 \times 130 \times \frac{1}{2} = 1,950$

$65 \times \frac{70+120}{2} = 6,175$

$20 \times 90 = 1,800$

$40 \times 70 \times \frac{1}{2} = 1,400$

$65 \times 175 = 11,375$

$40 \times 175 \times \frac{1}{2} = 3,500$

$85 \times \frac{10+25}{2} = 1,488$

$175 \times \frac{12+24}{2} = 2,625$

$181,625 \text{ S.F.} \times \frac{1}{9} = 20,180 \text{ S.F.}$

Rev. 20, Feb. 61

COMP. BY J.P.W.
CHECK BY _____
ACTIV. NO. 181

CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET _____ OF _____
DATE 2-2-61
LOCATION _____

SUBJECT Government Center Common

Granite Block Walks

Surface Area

230' x 10'	520' x 15' = 7,800 S.F.
230	
260	530' x 20
170	170
230	220
340	<u>70</u>
340	16 20' x 20' = 32,400
190	
120	60' x 140' = 8,400
220	
710	<u>36,400</u>
400	85,000 S.F. x $\frac{2}{9}$ = 18,889 S.F.
<u>150</u>	
3640' x 10 = 36,400 S.F.	

Say 9,500 S.Y.

Trees and Setting

85 Trees

Say 85 Each

Loaming and Seeding

$$3.1416 \times 140 \times 140 = 0.1875 \times \frac{1}{9} = 2,350 S.Y.$$

Say 6,000 S.Y.

TEST LOG

TEST NO.	TEST DATE	TEST TIME	TEST TYPE	TEST RESULT
1	10/10/2010	10:00	1000	1000
2	10/10/2010	10:05	1000	1000
3	10/10/2010	10:10	1000	1000
4	10/10/2010	10:15	1000	1000
5	10/10/2010	10:20	1000	1000
6	10/10/2010	10:25	1000	1000
7	10/10/2010	10:30	1000	1000
8	10/10/2010	10:35	1000	1000
9	10/10/2010	10:40	1000	1000
10	10/10/2010	10:45	1000	1000
11	10/10/2010	10:50	1000	1000
12	10/10/2010	10:55	1000	1000
13	10/10/2010	11:00	1000	1000
14	10/10/2010	11:05	1000	1000
15	10/10/2010	11:10	1000	1000
16	10/10/2010	11:15	1000	1000
17	10/10/2010	11:20	1000	1000
18	10/10/2010	11:25	1000	1000
19	10/10/2010	11:30	1000	1000
20	10/10/2010	11:35	1000	1000
21	10/10/2010	11:40	1000	1000
22	10/10/2010	11:45	1000	1000
23	10/10/2010	11:50	1000	1000
24	10/10/2010	11:55	1000	1000
25	10/10/2010	12:00	1000	1000
26	10/10/2010	12:05	1000	1000
27	10/10/2010	12:10	1000	1000
28	10/10/2010	12:15	1000	1000
29	10/10/2010	12:20	1000	1000
30	10/10/2010	12:25	1000	1000
31	10/10/2010	12:30	1000	1000
32	10/10/2010	12:35	1000	1000
33	10/10/2010	12:40	1000	1000
34	10/10/2010	12:45	1000	1000
35	10/10/2010	12:50	1000	1000
36	10/10/2010	12:55	1000	1000
37	10/10/2010	13:00	1000	1000
38	10/10/2010	13:05	1000	1000
39	10/10/2010	13:10	1000	1000
40	10/10/2010	13:15	1000	1000
41	10/10/2010	13:20	1000	1000
42	10/10/2010	13:25	1000	1000
43	10/10/2010	13:30	1000	1000
44	10/10/2010	13:35	1000	1000
45	10/10/2010	13:40	1000	1000
46	10/10/2010	13:45	1000	1000
47	10/10/2010	13:50	1000	1000
48	10/10/2010	13:55	1000	1000
49	10/10/2010	14:00	1000	1000
50	10/10/2010	14:05	1000	1000
51	10/10/2010	14:10	1000	1000
52	10/10/2010	14:15	1000	1000
53	10/10/2010	14:20	1000	1000
54	10/10/2010	14:25	1000	1000
55	10/10/2010	14:30	1000	1000
56	10/10/2010	14:35	1000	1000
57	10/10/2010	14:40	1000	1000
58	10/10/2010	14:45	1000	1000
59	10/10/2010	14:50	1000	1000
60	10/10/2010	14:55	1000	1000
61	10/10/2010	15:00	1000	1000
62	10/10/2010	15:05	1000	1000
63	10/10/2010	15:10	1000	1000
64	10/10/2010	15:15	1000	1000
65	10/10/2010	15:20	1000	1000
66	10/10/2010	15:25	1000	1000
67	10/10/2010	15:30	1000	1000
68	10/10/2010	15:35	1000	1000
69	10/10/2010	15:40	1000	1000
70	10/10/2010	15:45	1000	1000
71	10/10/2010	15:50	1000	1000
72	10/10/2010	15:55	1000	1000
73	10/10/2010	16:00	1000	1000
74	10/10/2010	16:05	1000	1000
75	10/10/2010	16:10	1000	1000
76	10/10/2010	16:15	1000	1000
77	10/10/2010	16:20	1000	1000
78	10/10/2010	16:25	1000	1000
79	10/10/2010	16:30	1000	1000
80	10/10/2010	16:35	1000	1000
81	10/10/2010	16:40	1000	1000
82	10/10/2010	16:45	1000	1000
83	10/10/2010	16:50	1000	1000
84	10/10/2010	16:55	1000	1000
85	10/10/2010	17:00	1000	1000
86	10/10/2010	17:05	1000	1000
87	10/10/2010	17:10	1000	1000
88	10/10/2010	17:15	1000	1000
89	10/10/2010	17:20	1000	1000
90	10/10/2010	17:25	1000	1000
91	10/10/2010	17:30	1000	1000
92	10/10/2010	17:35	1000	1000
93	10/10/2010	17:40	1000	1000
94	10/10/2010	17:45	1000	1000
95	10/10/2010	17:50	1000	1000
96	10/10/2010	17:55	1000	1000
97	10/10/2010	18:00	1000	1000
98	10/10/2010	18:05	1000	1000
99	10/10/2010	18:10	1000	1000
100	10/10/2010	18:15	1000	1000

COMP. BY J.P.W.
CHECK BY _____
ACTIV. NO. 131

CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET _____ OF _____
DATE _____
LOCATION _____

SUBJECT Government Center Common

Lighting (See Sketch)

Single Unit Standards	42 Each
Multiple Unit Standards	2 Each
*4 $\frac{3}{16}$ Cable	3800 L.F.
*6 $\frac{2}{16}$ Cable	2000 L.F.
Trench	6000 L.F.
Photo Cells	7 Each
Relays	7 Each
Junction Boxes	2 Each
Distribution Manhole	1 Each

Drainage

12" Reinf. Conc. Pipe	1650 L.F.
15" " " "	150 L.F.
18" " " "	625 L.F.
24" " " "	450 L.F.
Inlets	40 Each
Manholes	10 Each
10" Sub-drain	1100 L.F.
Grating	900 L.F.

COMP. BY JM
CHECK BY _____
ACTIV. NO. _____

CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET _____ OF _____
DATE 6-28-61
LOCATION _____

SUBJECT GOVERNMENT CENTER COMM.

RETAINING WALL 1210 Feet Long

Footing Concrete $8 \times 2 \times \frac{1}{2} \times 1210 = 720 \text{ c.y.}$

Stem Concrete $175 \times 13 \times \frac{1}{2} \times 1210 = 1020 \text{ c.y.}$

Reinforcing $150 \text{ #} \times 1740 = 261000 \text{ #}$

Excavation. $6 \times 240 \times 10 = 14400$

$4 \times 200 \times 10 = 8000$

$5.5 \times 270 \times 10 = 14850$

$4 \times 250 \times 10 = 10000$

$5 \times 170 \times 10 = 8500$

$\frac{58450}{2.5} = 23380 \text{ c.}$

1. The first part of the report is a general introduction to the subject of the study. It discusses the importance of the problem and the objectives of the study. It also mentions the scope of the study and the methods used.

2. The second part of the report is a detailed description of the experimental work. It includes a description of the apparatus used, the procedure followed, and the results obtained. It also includes a discussion of the results and a comparison with the results of other studies.

3. The third part of the report is a conclusion. It summarizes the main findings of the study and discusses the implications of the results. It also mentions the limitations of the study and suggests areas for further research.

COMP. BY J.P.W.
CHECK BY _____
ACTIV. NO. 191

CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET _____ OF _____
DATE 8-29-61
LOCATION _____

SUBJECT Dock Square Plaza Area

Cobblestone Paving

$$\begin{aligned}\text{Surface Area} \quad 55 \times 183 &= 10,065 \\ 51 \times 165 &= 8,415 \\ 46 \times 133 &= 6,118 \\ 62 \times 192 &= 11,904 \\ 47 \times 166 &= 7,802 \\ 72 \times 170 - 1521 &= 10,719 \\ 35 \times 135 \times \frac{1}{2} &= \underline{2,363} \\ 57,386 \text{ S.F.} \times \frac{1}{7} &= 6,376 \text{ S.Y.}\end{aligned}$$

Say 6,500 S.Y.

Granite Block Walks

$$\begin{aligned}\text{Surface Area} \quad 320 \times 10 &= 3,200 \\ 70 \times 10 &= 700 \\ 350 \times 10 &= 3,500 \\ 100 \times 35 &= 3,500 \\ 90 \times 20 &= \underline{1,800} \\ 12,700 \text{ S.F.} \times \frac{1}{7} &= 1,400 \text{ S.Y.}\end{aligned}$$

Say 1,400 S.Y.

Trees and Setting

30 Trees

Say 30 Each

COMP. BY	DATE	TEST
CHECK BY	DATE	TEST
ACTIVE NO.	LOCATION	TEST
SUBJECT		

CLARKSON ENGINEERING CO., INC.

CLARKSON ENGINEERING CO., INC.
 1000 N. 10TH ST.
 SUITE 100
 MINNEAPOLIS, MN 55412
 (612) 338-1111
 FAX (612) 338-1112

CLARKSON ENGINEERING CO., INC.

CLARKSON ENGINEERING CO., INC.

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 SUITE 100
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CLARKSON ENGINEERING CO., INC.

CLARKSON ENGINEERING CO., INC.

CLARKSON ENGINEERING CO., INC.

CLARKSON ENGINEERING CO., INC.

CLARKSON ENGINEERING CO., INC.

COMP. BY J.P.W.

CHECK BY _____

ACTIV. NO. 121CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET _____ OF _____

DATE 8-25-61

LOCATION _____

SUBJECT Dock Square Plaza AreaLighting

Circuit No.	Standard's	Cable # ₁ # ₂	Trench	Photo Cells	Relay	Dist. M.H.	
1	5	450	450	1	1	1	
2	5	550	550	1	1		
3	5	480	480	1	1		
Total	15	1480	1480	3	3	1	

Single Unit Standards 15 Each

#6-2c Cable 1500 L.F.

Trench 1500 L.F.

Photo Cells 3 Each

Relays 3 Each

Manhole (Use $\frac{1}{2}$ for cost) $\frac{1}{2}$ Each

COMP. BY	DATE	TIME
CHECK BY	LOCATION	
ACTG. NO.		
SUBJECT		

CLARKSON ENGINEERING CO., INC.
 ENGINEERING

ITEM NO.	DESCRIPTION	QTY	UNIT	PRICE	TOTAL
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COMP. BY J.P.W.
 CHECK BY _____
 ACTIV. NO. 181

CLARKESON ENGINEERING CO., INC.
 ENGINEERS

SHEET _____ OF _____
 DATE 2-2-54
 LOCATION _____

SUBJECT Pemberton Square Grading

Excavation

Sta.	P.R.	Ave. P.R.
0+00	0.00	
		0.61
1+00	1.22	
		1.47
2+00	1.72	
		1.03
3+00	0.34	
4+00		
5+00		
6+00		
		<u>3.11</u>

$$3.11 \times 100 \times 250 \times \frac{1}{27} = 2,880 \text{ C.Y.}$$

Embankment

Sta.	P.R.	Ave. P.R.
0+00	0.00	
		0.36
1+00	0.72	
		0.87
2+00	1.02	
		1.25
3+00	1.48	
		1.25
4+00	1.02	
		1.80
5+00	2.58	
		2.30
6+00	2.02	
		<u>7.83</u>

$$7.83 \times 100 \times 250 \times \frac{1}{27} = 7,250 \text{ C.Y.}$$

$$\begin{array}{r}
 - 2,880 \\
 4,370 \\
 +20\% \\
 \hline
 874 \\
 \hline
 5,244 \text{ C.Y.}
 \end{array}$$

Excavation

Say 2,900 C.Y.

Embankment

Say 5,200 C.Y.

COMP. BY _____
CHECK BY _____
ACTIV. NO. _____

CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET _____ OF _____
DATE 6-28-61
LOCATION _____

SUBJECT PEMBERTON SQUARE GRADING

RETAINING WALL AT PEMBERTON SQUARE

Length of wall = 360 feet

Average height of wall = 21.64

Quantities:

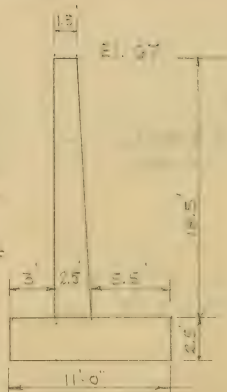
Footing Concrete $2.5 \times 11 \frac{1}{2} = 1.02 \text{ cy/LF}$

Concrete Above Footing $\frac{1.5+2.5}{2} \times \frac{18.5}{2} = 1.36 \text{ cy/LF}$
2.38 cy/LF

Total Concrete $2.38 \times 360 = 856 \text{ cy (900cy)}$

Reinforcing Steel $150 \#/\text{cy} \times 900 = 135000 \#$

Excavation $12 \times 8 \times 360 \frac{1}{2} = 1560 \text{ cy (1600cy)}$



COMP. BY J.P.W.
 CHECK BY L.M.
 ACTIV. NO. 131-024

CLARKESON ENGINEERING CO., INC.
 ENGINEERS

SHEET 1 OF 1
 DATE 6/26/60
 LOCATION _____

SUBJECT Central Artery - Surface Improvements

A1

Surface Area.

$$\begin{array}{rcl}
 30' \times 210' & = & 6300' \\
 20' \times 110' & = & 2200' \\
 30' \times \frac{110'}{430} & = & \frac{3300'}{430} \\
 11,800' \times \frac{1}{9} & = & 1,311' \text{ S.Y.} \quad \text{Say } 1,300 \text{ S.Y.} \\
 & & \text{Excavation } 675 \text{ L.F.}
 \end{array}$$

Curbing R+R

$$\begin{array}{rcl}
 2 \times 210' & = & 420' \\
 2 \times 110' & = & 220' \\
 & & \frac{110}{750} \text{ S.F.} \quad \text{Say } 750 \text{ L.F.}
 \end{array}$$

Sidewalk

$$6' \times 210' = 1260' \times \frac{1}{9} = 140 \text{ S.Y.} \quad \text{Say } 150 \text{ S.Y.}$$

B

Surface Area.

$$\begin{array}{rcl}
 30' \times 190' & = & 5700' \\
 20' \times 90' & = & 1800' \\
 20' \times \frac{140'}{150} & = & \frac{2800'}{150} \\
 10,300' \times \frac{1}{9} & = & 1,144' \text{ S.Y.} \quad \text{Say } 1,150 \text{ S.Y.} \\
 & & \text{Excavation } 575 \text{ L.F.}
 \end{array}$$

Curbing R+R

$$\begin{array}{rcl}
 240' \\
 140' \\
 310' \\
 \hline
 150' \\
 840 \text{ L.F.} \quad \text{Say } 850 \text{ L.F.}
 \end{array}$$

Sidewalk

$$\begin{array}{rcl}
 150' \\
 \hline
 310' \\
 460' \times 6' \times \frac{1}{9} & = & 307 \text{ S.Y.} \quad \text{Say } 300 \text{ S.Y.}
 \end{array}$$

COMP. BY L.P.W.
CHECK BY J.L.V.
ACTIV. NO. 181024

CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET 22 OF 22
DATE 6/26/61
LOCATION _____

SUBJECT Central Artery - Surface Roadways

F1.

Surface Area

$$30' \times 210' = 6300'$$

$$20' \times \frac{110}{320} = \frac{2200}{320}$$

$$8500' \times \frac{1}{9} = 944.5' \quad \text{Say } 950.5'$$

$$\text{Excavation} \quad 925.5'$$

Curbing R+R

$$190'$$

$$170'$$

$$\frac{270'}{630 \text{ L.F.}}$$

$$630 \text{ L.F.}$$

$$\text{Say } 650 \text{ L.F.}$$

G1

Surface Area

$$30' \times 630' = 18,900' \times \frac{1}{9} = 2,100' \quad \text{Say } 2,100' \text{ s.f.}$$

$$\text{Excavation} \quad 2,100' \text{ s.f.}$$

Curbing (New)

$$2 \times 630' = 1260 \text{ L.F.}$$

$$\text{Say } 1250 \text{ L.F.}$$

J1

Surface Area

$$33' \times 625' = 20,625' \times \frac{1}{9} = 2,292.5' \quad \text{Say } 2,300' \text{ s.f.}$$

$$\text{Excavation} \quad 1,150' \text{ s.f.}$$

Curbing R+R

$$600$$

$$200$$

$$\frac{800}{1150 \text{ L.F.}}$$

$$1150 \text{ L.F.}$$

$$\text{Say } 1,150 \text{ L.F.}$$

Sidewalk

$$6' \times 270' \times \frac{1}{9} = 180' \text{ s.f.}$$

$$\text{Say } 220' \text{ s.f.}$$

COMP. BY J.P.W.
CHECK BY J.W.
ACTIV. NO. 181.683

CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET 8 OF 1
DATE 6/20/61
LOCATION _____

SUBJECT Central Artery - Surface Roadways

Blackstone St.

Surface Area. (None - use existing Roadway)
(Patch at Curbing)

Say 150 S.Y.
75 C.Y.

Curbing R+R

Excavation

350 L.F.

Say 350 L.F.

Roadway Approaches to Tunnel

Surface Area.

$$25' \times 250' = 6,250$$

$$20' \times 100 = 2,000$$

$$8,250 \div 9 = 916 \text{ S.Y.}$$

Patching.

$$\frac{284 \text{ S.Y.}}{1200}$$

Say 1200 S.Y.
600 C.Y.

Excavation

Curbing . 200'

160'

200'

200'

300'

300'

1360 L.F.

Say 500 L.F. R+R
Say 1000 L.F. New.

Sidewalk.

$$6' \times 300' \times \frac{1}{9} = 200 \text{ S.Y.}$$

Islands

$$10 \times 80 = 800'$$

$$10 \times 90 = 900'$$

$$10 \times 150 = 1500'$$

$$15 \times 70 = 1050'$$

$$4250 \times \frac{1}{9} = 472'$$

$$\frac{200}{672}$$

Say 700 S.Y.

COMP. BY _____	CLARKSON ENGINEERING CO., INC.	SHEET _____
CHECK BY _____	_____	DATE _____
ACTV. NO. _____	_____	LOCATION _____
SUBJECT _____	_____	_____

[Faint, mostly illegible text and markings, possibly bleed-through from the reverse side of the page. Some words like "SHEET", "DATE", "LOCATION", "SUBJECT" are visible in reverse.]

COMP. BY J.P.W.
CHECK BY J.P.W.
ACTIV. NO. 131.024

CLARKESON ENGINEERING CO., INC.
ENGINEERS

SHEET 2 OF 2

DATE 8/22/81

LOCATION _____

SUBJECT Central Artery - Surface Excavation

Washington St. South.

Surface Area.

$$30' \times 400' \times \frac{1}{2} = 1,333 \text{ S.Y.}$$

Excavation

Say 1,350 S.Y.

275 C.Y.

Curbing R+R

80'

240'

60'

130'

80'

590' L.F.

Say 600 L.F.

Artery - Down Ramp to Chardon St.

Surface Area.

$$30' \times 240' \times \frac{1}{2} = 800 \text{ S.Y.}$$

Excavation

Say 800 S.Y.

200 C.Y.

Curbing

Say 480 L.F.



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Use average 100' span for deck

Ref. Fig. 12

Deck Concrete	$28 \times 100 \times \frac{9}{12} \times \frac{1}{27}$	= 78 c.y.	0.78 c.y.
Bituminous Surfacing	$\frac{2.5}{12} \times 28 \times 100 \times 160 \times \frac{1}{2000}$	= 46.5 Tons	0.47 Tons
Membrane Waterproofing	$28 \times 100 \times \frac{1}{9}$	= 311 s.y.	3.11 s.y.
Reinforcing Steel	$7 \frac{1}{4} \phi \times 28 \times 100$	= 19600 #	196 #

Structural Steel

2 Girders	$\frac{1}{2}$ 2-18" \times $\frac{3}{4}$ " \times 59'	$2 \times 59 \times 46 \times 2 = 10800$
	$\frac{1}{2}$ 1-18" \times $\frac{3}{4}$ " \times 100	$1 \times 100 \times 46 \times 2 = 9200$
	$\frac{1}{2}$ 1-18" \times $\frac{3}{4}$ " \times 77	$1 \times 77 \times 46 \times 2 = 7100$
Web	$84 \times \frac{1}{2}$ " \times 100	$1 \times 100 \times 143 \times 2 = 28600$
Fls	4-8" \times 8" \times $\frac{3}{4}$ "	$4 \times 100 \times 38.9 \times 2 = 31100$
5 Floor Beams	36 WF 194 \times 32 Lg.	$5 \times 194 \times 32 = 31000$
2 Stringers	27 WF 102 \times 100' Lg.	$2 \times 102 \times 100 = 20400$
50 Crossbeams	16 WF 36 \times 44' Lg.	$50 \times 36 \times 44 = 79000$

Stiffeners, Connections, Railings, Corbing 25%

217,200 #
 54,500
 271,700 #

2717 #

Substructure

Crossbeam	4 x 6 \times 6 \times $\frac{1}{2}$	$4 \times 24 \times 30 = 2880$
Web	84 \times $\frac{3}{16}$	$125 \times 30 = 3750$
2 Columns	2-14 WF 142	$2 \times 142 \times 16 \times 2 = 9150$

15,750 #/bent.

157.3 #

Concrete Footing $[2 \times 10 \times 12 \times 6 + 5 \times 20 \times 6] \frac{1}{27} = 7.6$ c.y./bent

0.076 c.y.

Reinforcing 200 #/c.y. \times 7.6 = 1520 #/bent

15.2 #

14 BP 89 # Piles 14 \times 89 \times 60' = 75,000 #/bent

750 #

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Cost of Structure per running foot

Deck Concrete	0.78 c.y.	@	60 ⁰⁰	=	46.80
Bituminous Concrete	0.47 Tons	@	7 ⁰⁰	=	3.29
Membrane	3.11 s.y.	@	2 ⁵⁰	=	7.78
Reinforcing Steel	196 #	@	0.13	=	25.48
Structural Steel	2874.3 [#]	@	0.17	=	488.63
Footing Concrete	0.076 c.y.	@	25 ⁰⁰	=	1.90
Footing Reinforcing	15.2 #	@	0.13	=	1.98
Steel Piles	750 #	@	0.14	=	105.00
					<u>\$ 680.86 / Running ft.</u>

Out to out of deck 34'

Cost per square foot = $680.86 / 34 = 20⁰⁰ / ft$

COMP. BY S.M.

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Removal of Approach Section

$$\begin{aligned} \text{Concrete } 3.2 \text{ c.y./lin Ft. @ } 25 &= 80 \\ \text{L \& R Gravel } 13 \text{ c.y./lin Ft. @ } 3 &= \frac{39}{119} \times 1.10 = 132 \end{aligned}$$

Build new walls

$$\text{Concrete } 3.2 \text{ c.y./lin Ft. @ } 60 = 192$$

$$\text{Exc. \& piles } 20\% = \frac{23}{210}$$

COMP. BY P.W.
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SUBJECT Central Artery Interchange Appointments - Interim

roadway Changes - Interim

Surface Area

$$20 \times 80 \times \frac{1}{2} = 800 \text{ S.F.}$$

$$10 \times 20 = 200$$

$$25 \times 70 = 1750$$

$$10 \times 150 = \underline{1500}$$

$$4250 \text{ S.F.} \times \frac{1}{3} = 472 \text{ S.Y.}$$

Say 500 S.Y.

Excavation

$$15' \times 500 \text{ S.Y.} \times \frac{1}{3} = 250 \text{ C.Y.}$$

Say 250 C.Y.

Curbing B+C

130

250

150

250

780 L.F.

Say 800 L.F.

Sidewalk

$$6' \times 450' \times \frac{1}{3} = 300 \text{ S.Y.}$$

Say 300 S.Y.

2.2×10^8 2.2×10^8
 0.02 0.02
 0.02 0.02
 0.02 0.02

2.2×10^8 2.2×10^8

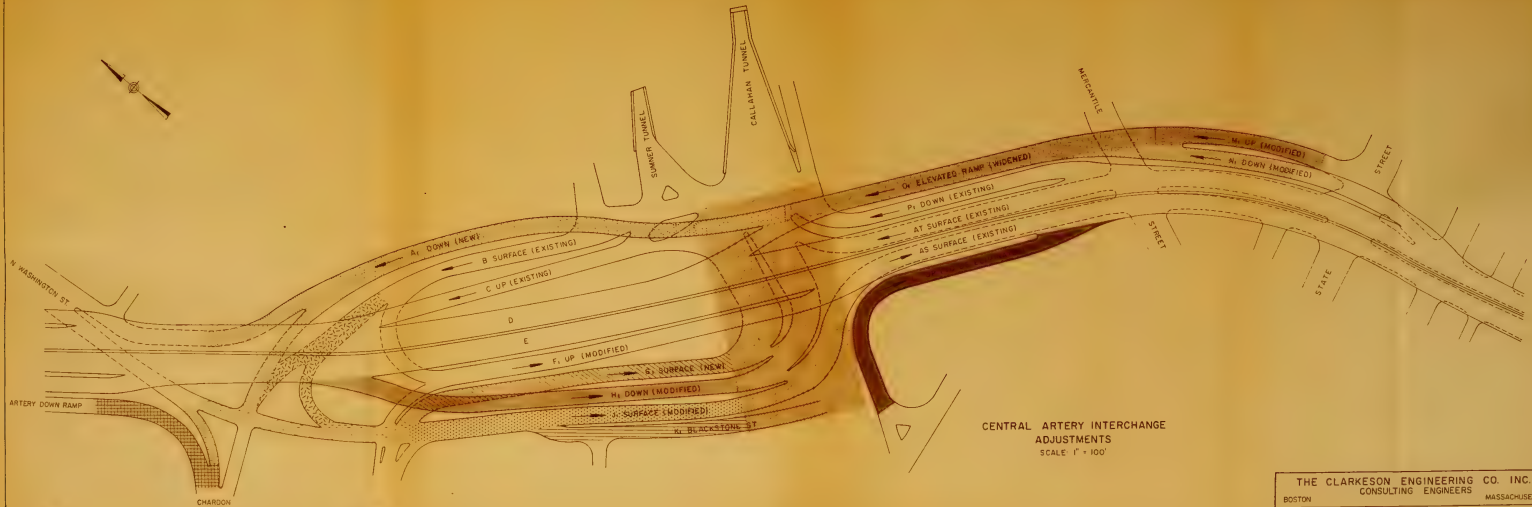
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